

REMARKS

By the present amendment claim 1 has been amended and claims 2, 3 and 17 have been cancelled. Support for the amendment is found in the cancelled claims and the specification.

The Examiner rejected claims 1-7 and 9-18 under 35 U.S.C. §103(a) as being unpatentable over Bird US 4,938,991 in view of Browning US 4,416,421. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching, suggestion, or motivation that would lead one of ordinary skill in the art to combine the references. *In re Sang Su Lee*, 277 F.3d 1338 ; 61 USPQ 2nd. 1430 (Fed. Cir. 2002), citing *Brown & Williamson Tobacco Corp. v. Phillip Morris, Inc.*, 229 F.3d 1120, 1124-25 (Fed. Cir. 2000); *In re Napier*, 34 U.S.P.Q. 2d 1782 (Fed. Cir. 1995). Elements of separate prior patents cannot be combined when there is no suggestion of such combination anywhere in those patents. *Panduit Corp. v. Dennison Mfg. Co.*, 1 USPQ 2^d 1593 (Fed. Cir. 1987). Further, when claimed subject matter has been rejected as being obvious in view of a combination of prior art references a proper analysis under section 103 requires a consideration of two factors: [1] Whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and [2] whether the prior art would also have revealed that, in so making or carry out , those of ordinary skill would have a reasonable expectation of success. *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991), *In re Dow Chemical Company*, 5 USPQ2d 1529 (Fed. Cir. 1988). Both the suggestion and the reasonable expectation of success must be found in the prior art not in the applicant's disclosure. *Id.*

By the present amendment claim 1 has been amended to further require that the particles have an average nominal diameter of from 106 to 250 microns, that the throat have a diameter of

from 1.5 to 3.5 millimeters and that the first population, which is being kinetically sprayed, directly bond to the substrate. None of these limitations are disclosed in either of the cited references nor are they obvious based on them.

The primary reference, Bird, teaches a flame spray method wherein a substrate is initially prepared by depositing carbide onto the substrate and adhering it to the substrate using a water glass adhesive. Then the substrate is heated to a temperature above the incipient melting temperature of the substrate to form a molten surface. Finally, a flame spray apparatus is used to spray a mixture of carbide and a molten alloy at the surface. The unmelted carbide is bound in the matrix formed by the molten alloy and the molten surface of the substrate. Bird discloses use of carbide having a particle size of less than 44 microns and an alloy having a particle size of less than 74 microns. The carbide is never directly bonded to the substrate as required by claim 1, nor are the particle sizes anywhere near those required by claim 1. Browning adds to this the concept of using a converging diverging nozzle in a flame spray apparatus. In Browning there is no discussion of the particle sizes, no discussion of using a mixture of particles wherein one population melts and the other does not, no discussion of kinetic spraying of the first population, and the only example of a throat dimension is given in column 4, lines 45 – 48. In that portion it is given as 5/16 of an inch which equals 7 millimeters.

The Examiner admits that neither reference teaches the particle sizes or the throat size; however, the Examiner suggests the selection of these is mere optimization. As a first matter, suggesting that determination of particle size and throat size are mere optimization is not adequate absent a showing in the art that these are result effective variables in the system. Neither reference gives any indication that particle size is important and when mentioned in Bird the size is well

below that required by claim 1. Neither reference discusses throat size as a result effective variable and the only size mentioned in Browning is well above that required by claim 1.

Claim 1 also requires that the first population directly bond to the substrate, a hall mark of the kinetic spray process. In Bird, the primary reference, it is clear that the carbide particles do not directly bond to the substrate. Instead they are trapped in the matrix formed by the molten layer on the substrate and the molten alloy. There is no teaching in either reference alone or in combination that would lead one of ordinary skill in the art to develop the system as claimed in claim 1 or to make it obvious. For this reason the rejection of claim 1 and the claims which depend there from under 35 U.S.C. §103(a) is improper and must be withdrawn.

The Examiner also rejected claim 8 under 35 U.S.C. §103(a) as being unpatentable over Bird in view of Browning '421 as applied to claims 1-7 and 9-18 above and further in view of Browning US 5,531,590. The Examiner relies on Browning '590 for teaching injection of the particles into the diverging region of the nozzle. Claim 8 depends from claim 1. As discussed above the primary and secondary references fail to make each and every limitation of claim 1 obvious and the deficiencies of the primary and secondary references are not overcome by the additional disclosure of Browning '590. Browning '590 does not teach directly injecting the particles into a diverging region after the throat. A review of Figure 2A of Browning '590 shows that the nozzle is not of a converging diverging type first of all. In fact, Browning teaches that such nozzles will not work with his invention and are in the prior art, see Figure 3A. In Browning '590 the particles are injected into the nozzle at the point where the nozzle is no longer diverging at the shock wave point. Thus, Browning fails to teach the limitation of claim 8 or make it obvious.

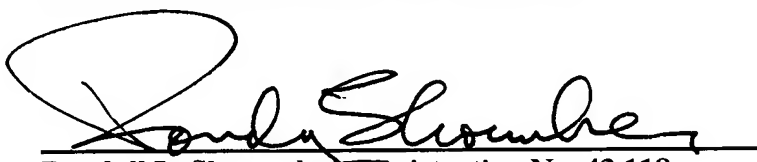
Browning '590 also fails to make obvious the limitations not taught or made obvious in Bird and Browning '421.

Applicant's attorney respectfully submits that the claims as amended are now in condition for allowance and respectfully requests such allowance.

Respectfully submitted,

HOWARD & HOWARD ATTORNEYS

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Date


Randall L. Shoemaker, Registration No. 43,118
Howard and Howard Attorneys, P.C.
The Pinehurst Office Center, Suite 101
39400 Woodward Ave.
Bloomfield Hills, MI 48304-5151
(248) 723-0425

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Rainie Mills

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